

Technical Reports

BC Coastal Forest Sector Hem-Fir Initiative

Enhanced Durability of Western Redcedar: Identification of the Unknown Extractive Most Highly Correlated with Decay Resistance in Field Tests

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Abstract

Until recently the thujaplicins were believed to be the extractives primarily responsible for the durability of western redcedar (WRC) in service. However, recent work examined correlations between decay resistance in ground contact field tests, and concentrations of WRC extractives. It found the strongest correlations with plicatic acid and unknown compound B. These results have major implications for breeding of planting stock for durability, the reputation of second growth (which can be low in thujaplicins), methods of enhancing WRC durability, and new wood protection technologies based on how natural durability works. Further progress on all of these fronts necessitated the identification of compound B. WRC wood meal was refluxed in water to produce an aqueous extract. The aqueous extract was extracted with chloroform and then with ethyl acetate. The ethyl acetate fraction contained 40-50% compound B, based on HPLC peak area. Further separation by semi-preparative HPLC and TLC, combined with mass spectral analysis, indicated that compound B was plicatin. Plicatin is the lactone of plicatic acid and would be expected to have many of the same properties. It has low water solubility and is a precursor to generation of the more water soluble plicatic acid by a simple hydrolysis. Further work is needed to understand its potential contribution to the durability of WRC.

Keywords: Durability, Extractives, Lignans, Plicatin, *Thuja plicata*, Western redcedar

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